Second Round
Tertiary Beam Monte-Carlo
# Test Beam for Liquid Argon Det.

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Spectrometer

- Standard 'Minerva' Configuration, but small chambers

    4 Fenker chambers (chambers exist, electronics....)

- Include ArgoNeuT Aperture (D = 4 inches, R ~ 50 mm)   (The trigger counter needs to be made.)

- Existing TOF counters   PMTs at each end of the counter

    1 upstream, crossed pair downstream (all existing)

- Also study shielding. May want to add shielding to reduce the punch-through through the basic collimator

- The **port** is a little less than 5% of the area of the full detector.

Nominal Tertiary Beam

W Chamb

port

TOF

Detectors for Background Studies
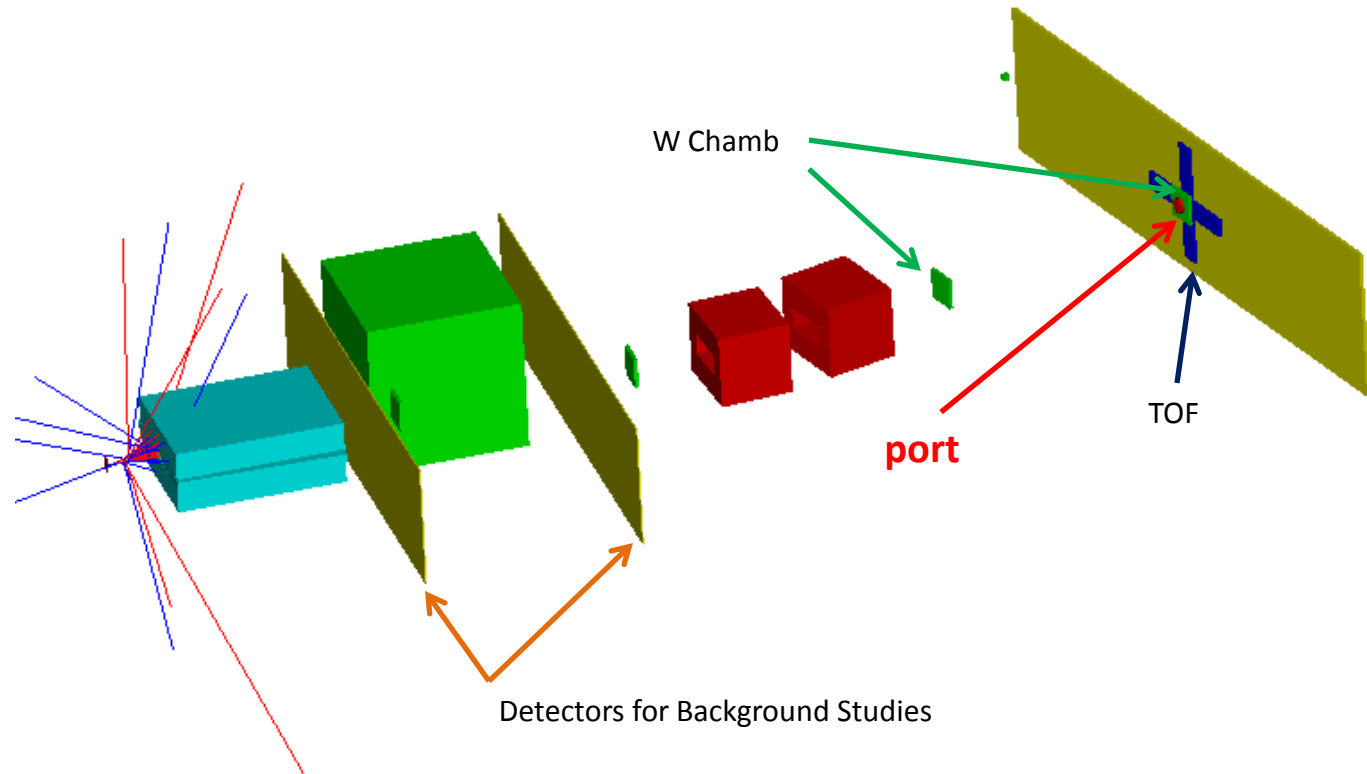
G4beamline Runs

- Run 1: 3×10^6 generated π^+, NDB negative polarity (select π^-) and do not kill collimator hits (Ckill=0). Study rate and backgrounds.   physics = QGSP_BIC in G4beamline

- Run 2: 3×10^6 generated, NDB+, Ckill=1

- Run 3: 3×10^6 generated, NDB+/2, Ckill=1

- Run 4: 3×10^6 generated π^-, NDB-, Ckill=1

- Reminder, Beam can provide up to 3×10^5 $\pi^{\pm}$/spill, 1 spill per minute lasting 4 seconds.

3 x 10^6 π$^+$ on the Cu target
NDB magnets at 100 A

Particles and momenta
that make it into the **port**

At the first WC,
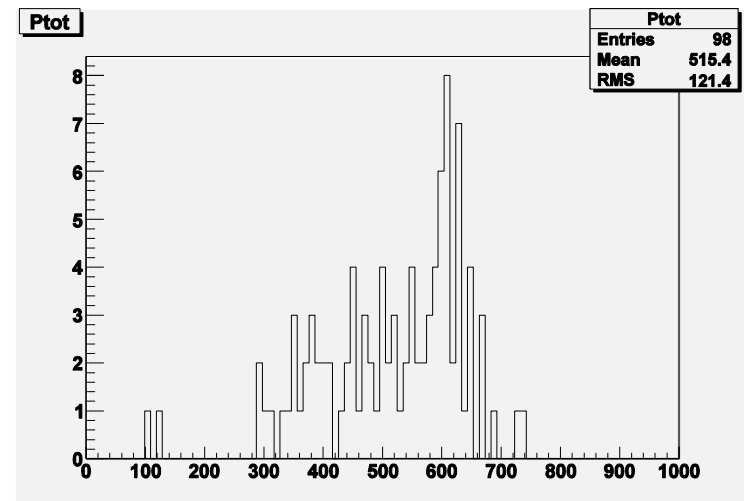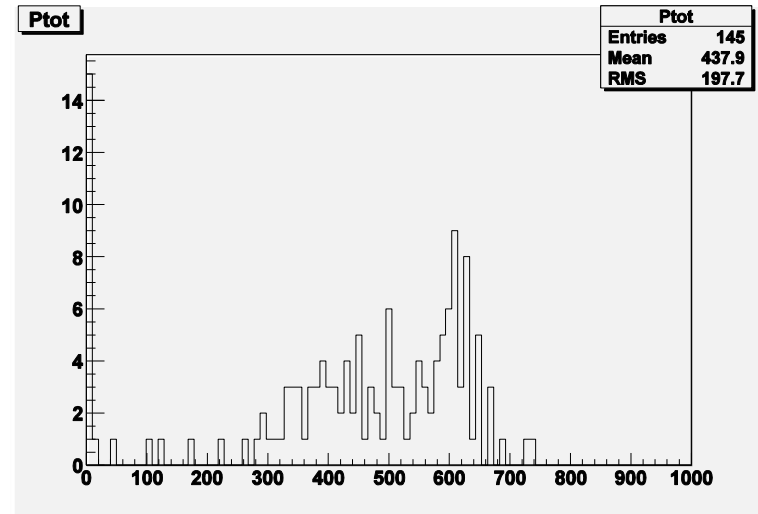**K$^+$/π$^+$ = K$^-$/π$^-$ = 0.16%**
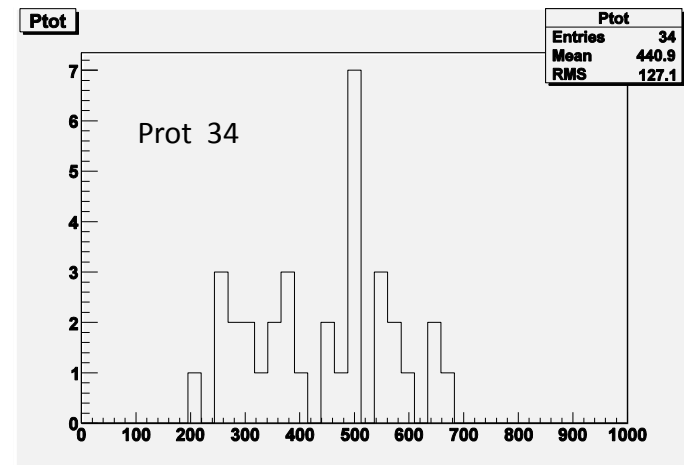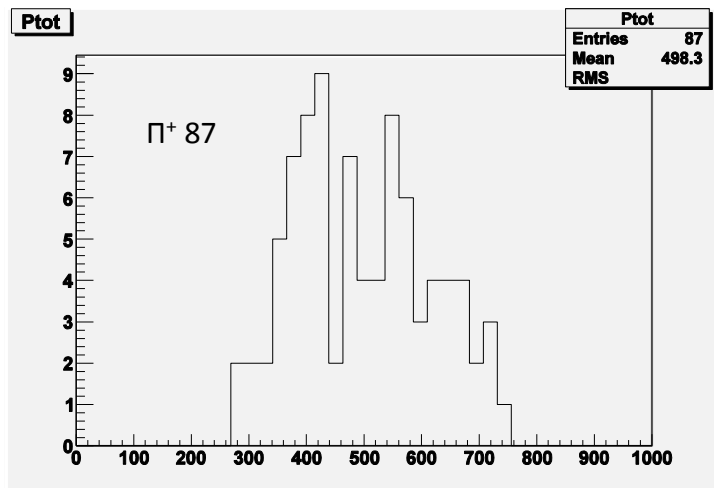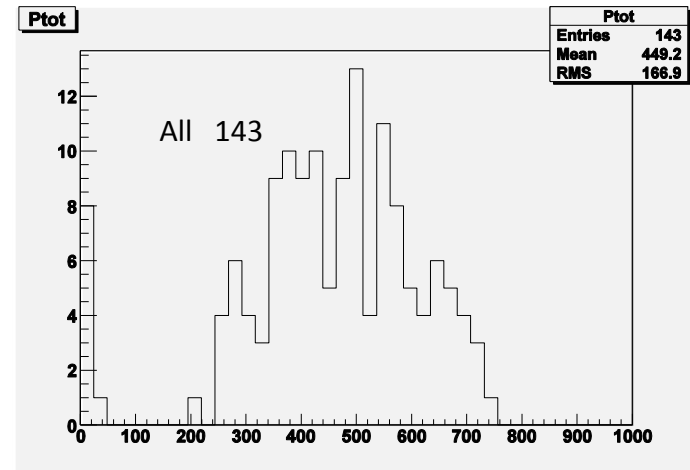
3 x 10^6 π⁻ on the Cu target
NDB magnets at -100 A

Negative beam and NDB
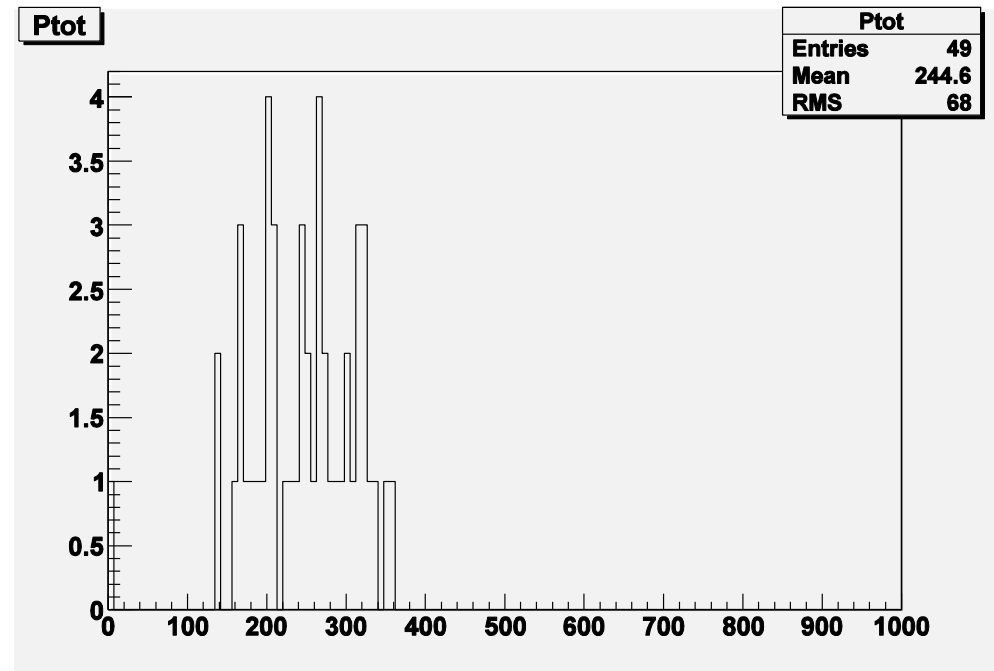
145 tracks into **port**
 98 π⁻   <p> = 515 MeV/c
 27 μ⁻,   18 e⁻

3 x 10^6 π⁺ on the Cu target
NDB magnets at 50 A

Particles into the **port**

About a third the rate: 49,
down from 143

<S(p)>   245 MeV/c,
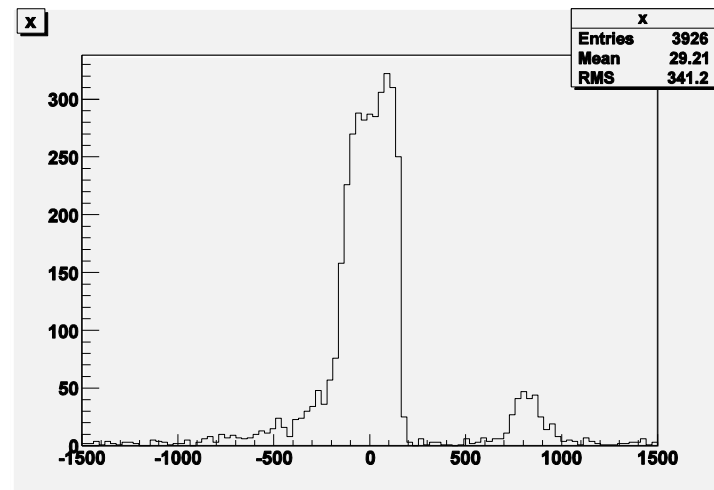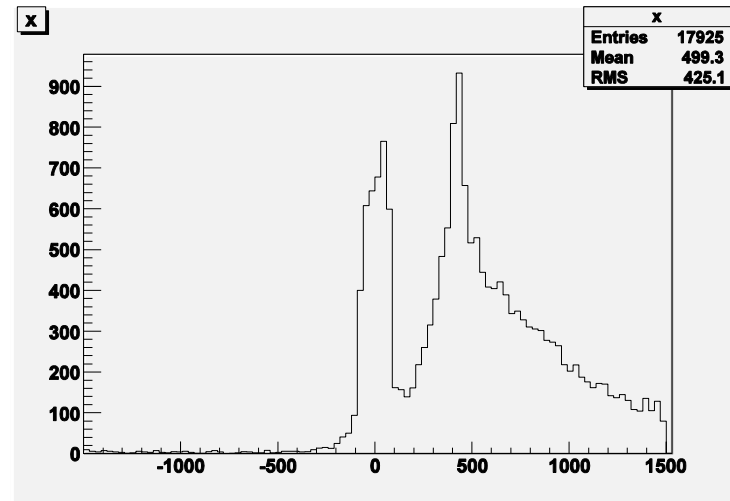down from 440 MeV/c

Background – punch-through from the collimator

The existing collimator is a bit short to contain the shower from beam dumping

Adding the block of Fe downstream of the dump greatly reduces the flux.

Based on 300K π^+ run, Two upstream lare detectors

Some Histogram Files

pi+ runs,

- PtotAll_3Mpos.C
- PtotProt_3Mpos.C
- PtotPiPl_3Mpos.C

pi+ run, NDBs in reverse polarity

- PtotAll_3Mneg.C

- Pi- runs pi- momentum, and all particles momentum spectra
- PPim_pim3MBm.C
- Pall_Pim3MBm.C